Integrating Acquisition with Software and Systems Engineering: Providing More Structured Guidance to Better Satisfy the Needs of Users

Lt. Col. Joe Jarzombek
ESIP Director

With continued emphasis on acquisition reform initiatives, the Department of Defense and services acknowledge the significant role of acquisition organizations in delivering capabilities. They now have an opportunity to provide more structure to guide and assess program offices in maturing their acquisition capabilities. The need is evidenced by inspection and audit agency reports that have attempted to address why so many software intensive systems have failed operational tests. Indeed, some of the findings and recommendations deal with needed changes to processes and practices within the acquisition organizations. Recognizing the need, some government program offices, both in the acquiring and sustaining phases of the life cycle, are now using the Software Acquisition (SA) Capability Maturity Model (CMM)[SM] as a framework to guide and assess their internal activities.

A Level 3 development effort coupled with a Level 1 acquiring effort often equates to a Level 1 delivery capability to the end user; yet the Level 3 developer is often blamed, and the Software (SW) CMM is cited as inadequate. The reality is that an "immature" acquirer can force poor practices upon the developing organization, and domain expertise is important, both in the acquiring and developing organizations. Integrated product teams (IPT) offer one of the better forums for bringing the developer and acquirer together, and there is an opportunity to offer more help to guide and assess the effectiveness of such forums. By packaging best practices, CMMs serve as guides for process improvement.

IPT best practices are identified in the draft integrated product and process development (IPPD) CMM that is a source model for the Office of the Secretary of Defense-sponsored CMM Integration (CMMI) product suite. Software CMM version 2.0, draft C and Systems Engineering (SE) EIA 731 are the other two source models in the CMMI. However, even with these three models, there is a gap in coverage of some acquisition processes and practices that are critical to the delivery of products to the end user. At Software Technology Conference '99, Dr. Dolores Etter, Deputy Under Secretary of Defense (Science and Technology) noted the need to determine how we include acquisition within CMMI.

Many of the system acquisition best practices are captured in the SA-CMM, and that model, coupled with practices identified in acquisition reform initiatives, offers an effective starting point for merging system acquisition within the CMMI. SW and SE models include many key acquisition process areas such as risk management, requirements management, planning, subcontractor management, monitor and control, and configuration management. As a guide to better enable program teams in meeting user needs — including certification of the systems for operational safety, suitability, and effectiveness — a complete CMMI needs to include other acquisition and IPPD processes to provide the remaining relevant functions that are vital to delivering capabilities. Additional processes are needed to cover practices associated with supplier capability evaluations, transition for product deployment and support, product life cycle and product lines definition and management, external quality management, contract management, work environment management, and rigorous reviews of supplier project plans and test plans and user requirements documents. Many of these processes are addressed in this special software acquisition issue of *CROSSTALK*.

Some guidance is needed to enable acquiring organizations to know how effective they are in performing their functions. While it may be more than a year before the CMMI includes acquisition, interested organizations can now take advantage of the Federal Aviation Administration's integrated CMM (iCMM) to guide enterprise-wide process improvement since it integrates SW-CMM, SE-CMM, and SA-CMM in a single model. As an alternative, acquiring organizations might simply use the SA-CMM as a framework and use acquisition reform best practices as extensions to the processes identified in the SA-CMM. As a minimum, acquisition organizations should use some framework to guide and assess their capabilities that are vital to delivering systems and products to the users*. Successful development efforts are very dependent upon acquisition capabilities and practices. ◆

* Assistance in using models to guide and assess organizational capabilities is available through the Software Technology Support Center.

CMM is a service mark of Carnegie Mellon University. The Software Acquisition CMM, like the Software CMM, is a staged model with five levels of organizational maturity.

On the cover: Salt Lake graphic artist Brandon Scott used computer graphics to illustrate this month's special issue on software acquisition.